

# OBJECTIVE INTEGRATED COMBAT, COMMAND AND CONTROL TECHNOLOGY

## Introduction

Since the beginning of digital situational awareness (SA) integration onto our armored vehicles, our warfighters have been asking for ways to improve battle command on the move and command and control (C2) capabilities while at the “nametag defilade” position (see photo) or while dismounted from the vehicle. Currently, our armored leaders must get inside the platform to view SA displays and to send or receive digital C2 messages, thus losing the “eyeball” on the outside combat picture. This requirement is further emphasized by the integration of digital SA information on modern ground combat platforms (M1A2 SEP/M2A3) through the integration of Force XXI Battle Command Brigade and Below (FBCB2) systems. Objective integrated combat, command and control efforts will improve command and control capabilities by allowing the tank or vehicle commander to command his vehicle and maintain 100 percent SA from the nametag defilade position or while dismounted from the vehicle.

## Background

Currently, vehicle commanders must be tethered to the platform to receive, transmit, and view SA and C2 information. Trying to input digital information such as a SALT (size, activity, location, time) report using the keyboard or cursor control while on the move is difficult, if not impossible. The addition of touchscreen capabilities

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improves input, but it is still difficult while on the move.

Whether using the keyboard, cursor control, or touchscreen, the vehicle commander is still required to drop down inside the vehicle to be able to input SA and C2 information. This takes the vehicle/unit commander's eyes off the terrain or combat picture and he loses his ability to command the platform in a close fight. The objective integrated combat, command and control effort will allow the track commander (TC) to receive FBCB2 reports through a secure wireless local area network (SWLAN) cordless communications system, transmit FBCB2 SA data through the use of a tactical voice activation system (TVAS), and view that data in his helmet mounted display (HMD). All of this can be done from the nametag defilade position while the TC fights the battle or while the TC is untethered and off the vehicle.

The Objective Integrated Combat, Command and Control Program was initiated to reduce the armored crewmen's burden, improve soldier-machine interface (SMI), maintain C2 while in the vehicle nametag defilade position, and to maintain combat tactical overmatch through the use of technology improvements and enhancements.

Interim objective integrated combat, command and control technology integration efforts are designed to provide armored vehicle commanders with the ability to execute six FBCB2 C2 joint variable message format (JVMF) messages through the use of a TVAS. The goal is to see selected FBCB2 JVMF message screens on the commander's display units (CDUs) via an HMD, and to provide cordless communications or wireless local area network (WLAN) capabilities. This allows the commander and crew to still command and communicate through either the AN/VIC-3 Vehicle Intercommunications System (VIS) and/or the Single Channel Ground and Airborne Radio System (SINCGARS) while untethered from the vehicle. The six FBCB2 JVMF C2 messages selected for the initial TVAS integration are SALT, MEDEVAC (Medical Evacuation Report), NBC1 (Nuclear, Biological Chemical Report Number 1), Fire Mission, Check Fire All, and SITREP (Situation Report).

## A Joint Integration Effort

While addressing ongoing Abrams M1A2 SEP and Bradley M2A3 electronic obsolescence solutions, researchers also considered other combat enhancements such as objective integrated combat, command and control technologies. The intent was to improve the platforms' combat and tactical overmatch while extending the service life of these platforms out to 2030 and beyond.



*Abrams tank commander at nametag defilade*

Objective integrated combat, command and control is a joint technology integration effort with input from the Project Manager (PM), Abrams; PM, Bradley; PM, FBCB2; PM, Soldier; PM, Brigade Combat Team; PM, Paladin; the U.S. Army Training and Doctrine Command (TRADOC) Systems Manager (TSM) Abrams; TSM Bradley; TSM Force XXI; TSM Soldier; Future Combat Systems (FCS); the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC); the U.S. Army Communications-Electronics Command (CECOM); and the platform prime (General Dynamics Land Systems/United Defense Limited Partnership).

Objective integrated combat, command and control is a means to improve SMI and reduce soldier burdens on our combat platforms. It is a means to enhance our armored crewmen's ability to maintain 100 percent SA and combat capabilities while off the platform.

## **Technology Focus**

The objective integrated combat, command and control effort has focused on the use of commercial off-the-shelf (COTS) and military off-the-shelf (MOTS) technology solutions. The Objective Integrated Combat, Command and Control Program is focused on three new and improved technologies that will be merged into one effort to improve the vehicle SMI while reducing the soldier's burden. These three new technologies are discussed below.

*Tactical Voice Activation System.* TVAS is the first of these three new warfighter technologies to enhance combat effectiveness and improve SMI by using voice activation to manipulate FBCB2 message screens. TVAS is viewed as another input device like the keyboard or tank commander's cursor control device used to activate JVMF message sets in FBCB2. The requirements and functionality of TVAS have been defined by the warfighters and continue to be updated through subject matter expert reviews. The TVAS

COTS technology selection is from ITT Command Voice under contract with CECOM; PM, FBCB2; and PM, Abrams. TVAS also provides growth potential and capabilities for platform functionality in the future (built-in test/fault isolation test, vehicle health, etc.).

*Cordless Communications or WLAN.* Cordless communications or WLAN provides a cordless interface to an existing VIS such as the AN/VIC-3, which currently provides digital connectivity within the vehicle SINCGARS and Enhanced Position Location Reporting System radio systems.

The objective integrated combat, command and control effort will also integrate a MOTS SecNet 11 SWLAN Type 1 encrypted industry standard PCMCIA card developed by Harris Corp. This cordless or SWLAN gateway effort is based on the current Institute of Electrical and Electronics Engineers 802.11b 2.4 gigahertz standard using a secure radio frequency (RF) link. The SWLAN integration effort is focused on a COTS PC/104 and PC/104-plus material solution to minimize space claims,

reduce power consumption, enhance functionality and reliability, and survive harsh ground combat vehicle environments.

SWLAN technology integration is key to allow armored crewmen to communicate with the mounted armored crewmen on both the VIS and RF nets in a secure mode while untethered or dismounted from the vehicle. SWLAN will also allow the passage of digital traffic to maintain SA. The goal of SWLAN is to provide a secure intercom/radio communication, where the crewman is operating untethered off the platform up to 500 meters away from the platform.

*Helmet Mounted Displays.* HMDs are the third essential requirement for objective integrated combat, command and control systems. HMDs provide the SA to the armored crewmen to allow the crew to see FBCB2 and platform digital data. The HMD allows armored crewmen to see and control the CDU digital information while at the nametag defilade position or off the vehicle untethered. The HMD is attached to the combat vehicle crewman's helmet and is connected to the modified mounted warrior vest. The objective integrated combat, command and control HMD solution is a MOTS HMD from the current PM, Soldier Land Warrior (LW) Program. Objective integrated combat, command and control HMD growth potential could display other functionality such as 2nd GEN FLIR (second generation forward looking infrared) and streaming video.

## Goals

The objective integrated combat, command and control goals are as follows:

- Use the M1A2 SEP and Bradley M2A3 as the proof of principal (PoP) technology integration platforms to feed into other platform efforts such as the Interim Armored Vehicle, FCS,

and the Objective Force Warrior Program;

- Enhance and improve SMI and provide hands-free operation;
- Do not add additional burden to the crew; and
- Receive continuous program azimuth checks from the warfighters.

## Commonality

The Objective Integrated Combat, Command and Control Program focused on the integration of mounted warrior hardware. Thus, commonality between the current LW electronics was a key to this effort. Currently, the objective integrated combat, command and control effort shares the same LW load-bearing vest, HMD, and WLAN protocols.

The objective integrated combat, command and control effort integrates the following mounted warrior capabilities: wireless combat crew station, FBCB2 operations, vehicle crew station control, cordless voice communications (VIS/RF), communications security SWLAN Enhancement-National Security Agency-approved, TVAS, crewman HMD, thin client crewman electronics, and virtual network computing software architecture.

Objective integrated combat, command and control growth capabilities include vehicle software reconfiguration/download capabilities, SWLAN mission data loader, embedded tech/user manual capabilities, and embedded training/mission rehearsal capabilities.

## Current Status

The Objective Integrated Combat, Command and Control Program supported the Mounted Warrior Soldier System Cordless Communications (MWS2C2) customer test (CT) at Fort Knox, KY, in August and September 2002. The program also supported a hands-on objective integrated combat, command and control demon-

stration at the Association of the United States Army (AUSA) Annual Conference in October 2002, and will support a final objective integrated combat, command and control PoP demonstration on an M1A2 SEP tank in Warren, MI, in January 2003. The MWS2C2 CT demonstrated two vendors' cordless communications solutions. Results of that customer test will also be available at the January 2003 objective integrated combat, command and control demonstration in Warren, MI.

Data and integration efforts from the January 2003 objective integrated combat, command and control demonstration will provide TVAS voice libraries and templates to PM, FBCB2 for use in building TVAS into the FBCB2 Version 7.0 software effort. It will also provide valuable TVAS, SWLAN, FBCB2, and electronics data, material and integration solutions to PM, Soldier for the Mounted Warrior Program.

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